IN THE SPECIFICATION

Please replace paragraph [0028] with the following paragraph:

[0028]   FIG. 7 is a timing diagram of a time division multiplex signal which modulates a code division multiplex signal in accordance with the present invention.

Please replace paragraph [0029] with the following paragraph:

[0029]   FIGS. 8 and 9 are [[a]] block diagramdiagrams of a first embodiment of a transfer station in accordance with the present invention.

Please replace paragraph [0032] with the following paragraph:

[0032]   FIGS. 11A and 11B are [[a]] time slot assignment diagramdiagrams of a wireless telephone distribution system in accordance with the present invention illustrating the time division multiplexing and code division multiplexing for 24 simultaneous calls.

Please replace paragraph [0038] with the following paragraph:

[0038]   FIG. 17 is a timing diagram of a time division multiplex signal which is modulates a modulated code division multiplex signal in accordance with the present invention.

Please replace paragraph [0039] with the following paragraph:

[0039]   FIG. 18 is a system diagram illustrating a distributed antenna implementation of the present invention.

Please replace paragraph [0048] with the following paragraph:

[0048]   The mobile subscriber antenna 10 (also referred herein to as the user terminal antenna, or the subscriber station antenna, or simply antenna U) is coupled by a bidirectional radio link to antennas A, B and C. The CDMA transfer station 14 is further coupled by a bidirectional radio link through antenna T through appropriate switching to the public switch telephone network.

Please replace paragraph [0058] with the following paragraph:

[0058]   The system configuration of FIG. 6 is similar to that of FIG. 2 with the exception that each CDMA transfer station has either an antenna [[B]]A, or antenna B or an antenna C. For example, CDMA transfer station A, 108, has a separate antenna A, 109. The CDMA transfer station B, 106, has an antenna B, 107. Similarly, CDMA transfer station C, 104, has an antenna C, 105. Thus, the antenna 10 of CDMA subscriber station 112 receives signals from each of CDMA transfer stations 108, 106 and 104. The received signals are time division multiplexed in the sense that only one of antenna A, B or C is transmitting to antenna 10 at any one time. During transmission, however, antennas A, B and C provide multiple code division multiplexed signals to other users.

Please replace paragraph [0075] with the following paragraph:

[0075]   The CDMA transfer station has a TDMA input at antenna T. The output side of the transfer station at antennas A, B and C,A, B, and C uses a CDMA structure to reach a large number of subscribers in relatively densely populated areas. CDMA possesses several attributes that make it desirable for this application. The wideband signal is inherently robust in a multipath environment and it has the ability to overcome interference, intentional and otherwise. The

- 3 -

possibility that selective fading will cause the entire spectrum to be suppressed decreases as the transmitted spectrum increases. A higher chip rate, or increased TW product, reduces the amount of fade margin that is required to achieve a specified level of performance.

Please replace paragraph [0078] with the following paragraph:

[0078]   A block diagram of a transfer station in accordance with the first embodiment of this invention is shown in FIG. 8 for the forward channel. The TDMA antenna T, 916, is coupled through a transfer receive switch 918, to a TDMA receiver 800. The output of the TDMA receiver 800 is coupled to a demultiplexer 802, the output of which is stored in time slot buffers 806. A time multiplexer 808 accesses the contents of the time slot buffers 806 and provides data packets output to plural CDMA encoders 810 intended for antenna A transmission. The output of time multiplexer 808 also provides data packets output to plural CDMA encoders 812 intended for antenna C transmission. Similarly, the time multiplexer 808 provides data packets output to plural CDMA encoders 814 intended for antenna B transmission. Each of the plurality of CDMA encoders 810, 812 and 814 are provided to respective CDMA transmitters 816, ~~824~~818 and ~~826~~820. Each of CDMA transmitters is coupled to a respective antenna 822, 824 and 826 to provide respective antenna A, antenna B and antenna C transmissions.

Please replace paragraph [0084] with the following paragraph:

[0084]   In the reverse direction, and in reference to FIG. 9, the CDMA transmission from the subscriber station during time slot 3 is substantially simultaneously received on antennas 822, 824 and 826. Each of the CDMA receivers 902, 904 and 906 receive the same data packet. A maximum likelihood combiner

[[904]]908 combines the power from all three time slots before making a hard decision. Generally speaking, the signal which is strongest and error free will be selected. After selection, the data packet is held in a memory buffer and time slot multiplexer 910 waiting to be placed in its appropriate time slot for transmission by TDMA transmitter 914 on antenna 916.

Please replace paragraph [0112] with the following paragraph:

[0112]   In a cable based personal communication system, the transfer stations are moved back to the central controller, which reduces the cost of the transfer station since it does not have to be ruggedized or remotely powered. It also reduces the number of spares required and the cost to maintain the units since they are all in one place and easy access. The transfer stations can also be dynamically reassigned as the traffic load changes during the day or week, thus significantly reducing the total number of required transfer stations. The bandwidth of the distribution network increases, but developments in cable and fiber optic distribution systemsystems have increasing bandwidth at a falling cost to accommodate the increase in bandwidth at a reasonable cost. The advantage of having several interconnection options to select means that the choice of interconnection becomes an economic choice determined by the cost factors associated with each installation. Each network is expected to include many or all of the interconnection options.

Please replace paragraph [0116] with the following paragraph:

[0116]   The centrally located combined base station and transfer station (B-T) module 1404 combines the base station and transfer station function and converts the signal appearing on A' to the time slotted CDMA triple diversity air interface. A

B-T combined module may be achieved by direct combination of separate equipment, or the modules developed for the combined base station and transfer station use can be integrated. The CDMA signal branches at the output of the transfer station or at the output of the B-T module as shown in FIGS. 15 and 16. In the case of the ~~of the~~ transfer stations which are connected to respective antennas by three different cables, the output is just switched at the appropriate time. When one cable is used to reach all the antennas the output of the transfer station is frequency hopped at the appropriate time by changing the synthesizer frequency to the assigned frequency of the antenna. The B-T module is similarly frequency agile.

Please replace paragraph [0126] with the following paragraph:

[0126]   The user is paged on the control channel and given a CDMA and time slot assignment which he sets up so he will be ready for the beginning of the call. When the user requests service he is also given a CDMA code and time slot assignment for the duration of the call. The user terminal remains in this state until the end of the call, unless the signal in one or all <u>of</u> the diversity paths becomes weak. Since the user receiver is continuously evaluating the incoming signals and scanning for better new paths, it will know if a path is going bad and will notify the central controller of this condition along with a list of better candidates. The central controller will order a handoff and the user terminal will go to the new CDMA code and time slot. None of this activity is detectable by the end user.

Please replace paragraph [0127] with the following paragraph:

[0127]   At the beginning of each time slot is a short unmodulated section, without user information, used for resynchronization and range adjustment, followed by a short control message section. These short bursts are sent whether there is user information to be sent or not. If no user information is to be sent the control message confirms this and the transmitter power is reduced by ten [[db.]]dB for the user information portion of the time slot. It should be noted four time slots are available on the forward channel for passing user information depending on what agreements have been established between the user and the central controller. These slots as described above can be turned off so that other users have access to additional capacity. The multiple time slots can be used for diversity improvement or sending increased data rates, multiple data channels or a graphics channel along with a voice channel. The possibility of extending several parties on a conference call is also possible.

Please replace paragraph [0132] with the following paragraph:

[0132]   1. The pseudo noise code as it is stretched out between A and U to act as a yardstick. The time required to propagate between A and U allows many chips[[,]](the propagation time in microseconds times the chip rate in megachips[[,]]) to represent the length of the link or be "stored" in the link during signal propagation. See FIG. 20.

Please replace paragraph [0133] with the following paragraph:

[0133]   2.   There are two ways to increase the number of chips stored in the propagation path. One is to increase the path length and the other is to speed up the chip clock rate. Increasing the chip clock rate is analogous to marking a ruler

[[in]]<u>on</u> a smaller scale. Therefore, increasing the chip clock rate stores more chips in the path delay and makes it possible to make more accurate measurements.

Please replace paragraph [0137] with the following paragraph:

[0137]   6.   Thus, the distance AU is measured quite precisely. As described previously the receiver uses a single receiver for all time slots. While the subscriber receiver is listening to time slot one it is working in conjunction with the base station, to repeat the received waveform, same phase with no delay through the user terminal. The base station receiver, as described above, compares the received phase with the transmitted phase to determine absolute range. The base station then transmits the range value, thus measured, to the user terminal where it is stored for future retrieval and use. As noted above it is the waveform phase that is important[[, if]].<u>_ If</u> the starting point, the all ones vector, is maintained through the user terminal, a new similar PN code may be substituted on the reverse link. A similar code could include that same code shifted by a defined offset.

Please replace paragraph [0147] with the following paragraph:

[0147]   Position location processing is accomplished by a third party provider which owns and manages the position location center. Location service can be accomplished in several ways. The preferred approach is to make the user terminal the repository for all location information by building and maintaining a location file. The position location center queries the user terminal over the normal public switched telephone network (preferably packet) when it ~~needed~~<u>needs</u> information. Preferably, a provision for encryption during transmission and an access code for privacy [[is]]<u>are</u> used. The user terminal could also send location information to the location center, also over the public switched telephone network, responsive to user

activation. For instance, when the user pushed an alarm button, the radio sends the alarm message, along with the location information, to the location center. The location center would respond according to prearranged directions and the level of subscribed service. Since the user terminal radio develops the code offset information internally, the only additional information the cellular system needs to provide to the user terminal is the distance, one way or round trip, from the user to one of the base station/antennas. The distance information, which would be provided as a service feature to the user, must identify the base station/antenna. All the measurements must be performed within a time window of 100 milliseconds or the error as a result of vehicle movement between measurements could become excessive. For stopped vehicles or pedestrians the time window to perform location measurements could be much longer since there is little or no movement between measurements. Therefore, the distance measurement sent by the system to the user terminal includes the distance in feet, the time in milliseconds and the identity of the measuring entity. Upon receipt of the distance message the user terminal stores the message and makes code offset measurements to several different antennas, and, if signal levels are adequate, stores the composite information in the location file. The location file is retained until a new distance message is received by the user terminal radio, whereupon the user terminal radio again makes the code offset measurements and updates the location file.

Please replace paragraph [0148] with the following paragraph:

[0148]   When the location center queries the user terminal radio as to its location, the radio sends the contents of the location file. The location center processes this data into very accurate map data, ~~position on a particular street (can be displayed on a typical street map)~~such as position on a particular street which

can be displayed on a typical street map. The system measures distance to the subscriber normally once every minute when the subscriber is in the active receive mode, receiver on, waiting to be paged. The period between measurements is variable and can be adjusted according to the needs of the user. The system sends this new distance to the subscriber station which places it in the file and enters new code offset measurements with it. If the subscriber is engaged in a conversation, the user terminal is transmitting, the base station makes a measurement every ten seconds and if the distance changes more than one hundred feet the system sends a message to the subscriber station. Whenever the user terminal receives a distance measurement it adds the local code offset measurements and updates the file.

Please replace paragraph [0149] with the following paragraph:

[0149] ~~It can be seen the user terminals~~Preferably, the user terminal's location file is updated at least every minute and more often if warranted. Therefore, the system can know the location of any active user within a distance of approximately 100 feet. Better accuracy and more frequent updating is certainly possible, but due to the loading on the data links the number of subscribers receiving higher performance should be the exception rather than the rule. Whenever the user presses the alarm button on his portable terminal, the terminal transmits the contents of the location file three times which is long enough for the system to read a new distance and send a message to the user terminal. The user terminal makes several offset measurements and sends the new location file three times. The alarm message is repeated every thirty seconds until the battery goes dead. The user terminal radio can have a module added (with its own battery) that emits an audible tone whenever the radio alarm message is transmitted.

Please replace paragraph [0153] with the following paragraph:

[0153]   FIG. 18 illustrates a system with self-calibration. Once every minute the system queries each check point 1802. This results in a distance measurement being sent to the check point 1802 where the check point receiver adds the code offset measurements and sends the contents of the location file to the processor 1804 where the received file is compared with a file that contains the correct measurements. If the difference exceeds the ~~threshold~~threshold, the processor 1804 calculates the changes in delay that are required to bring the measurements within tolerance and passes the correction to the controller. The controller maintains a file that includes the variable delay 1806 to be inserted for each antenna. The controller changes the delay entry in the file and a new measurement is taken to validate the calibration. Changes that require significant changes in delay are unlikely, but if this should happen the controller would not initiate any measurements that include the leg that is under recalibration. Thus, the position location capability also provides a service for the communication system. Self calibration results in a significant reduction in installation cost and allows the use of more economical system components.